ELECTROMOTIVE FORCE –continued

1. Find the internal resistance in a 9.0V battery that supplies 0.40 A of electric current and its terminal voltage is 8.75 V.

2. A 9.0 V battery has internal resistance of 12 Ω.

a) What is the potential difference across the battery's terminals when the battery supplies current of 50.mA?

b) What is the maximum current this battery can supply?

3. A battery has an emf of 12.0V and internal resistance of 0.15Ohms. What is the terminal voltage when the battery is connected to a 1.5 Ohm resistor?

"Special Case"

4. A cell whose emf is 15V and internal resistance is 0.60 Ω is charged by supplying a 0.5A current in the direction shown. What is the terminal voltage of the cell while being charged?

$\varepsilon = 1.5V$
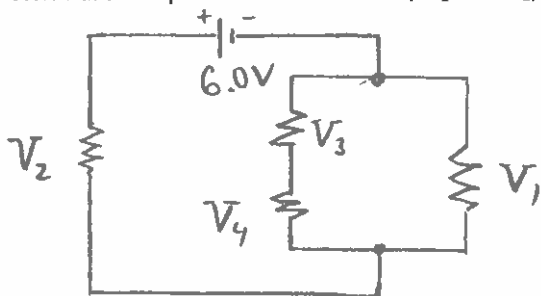
$r = 0.6\Omega$

$I = 0.5A$
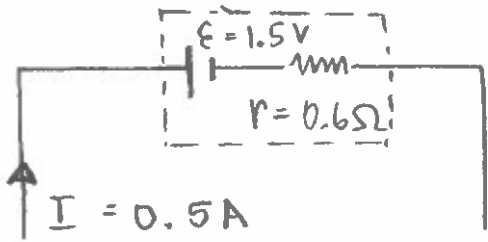
A Brief Review

1. The diagram below shows a circuit with four possible meter locations. In which locations should an ammeter and voltmeter be connected to correctly measure the current through R_1 and the voltage drop across R_2?
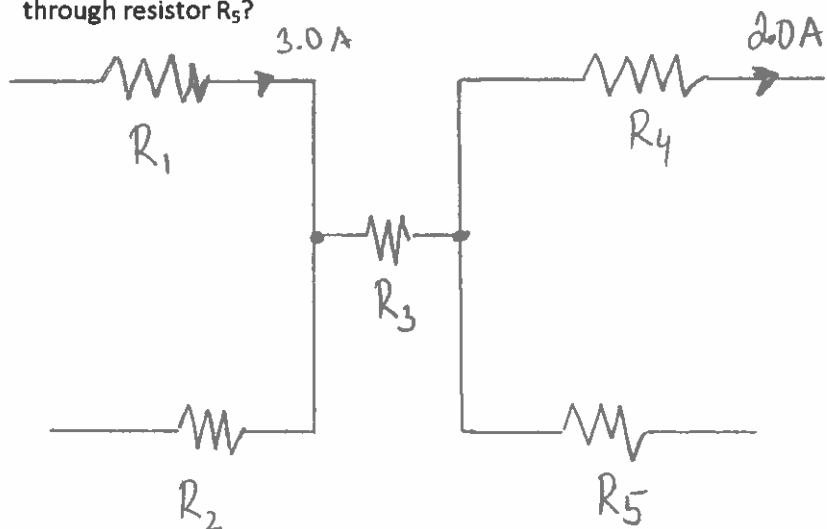
R_1

②

R_2

R_3 ③

①

④
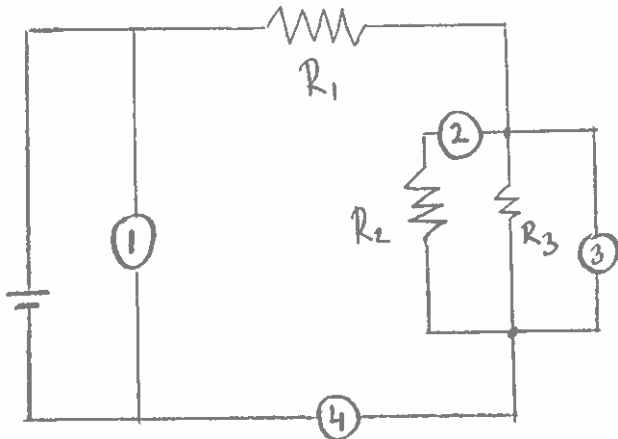
2. What are the potential differences, V_1 and V_2, in the circuit shown below?

+ $-$

6.0V

V_3

V_2

V_1

V_4

$V_3 = 2V$

$V_4 = 3V$

3. The diagram below shows part of an electrical circuit. What are the magnitude and direction of the current passing through resistor R_5?

4. A 12V battery is connected to a 60Ω resistor. How much charge will flow through the resistor in 20s?

5. A 2.50 W device requires a 1.2V to operate properly. A 1.45 V cell, with internal resistance r, is used to power this device. What value of r enables the cell to provide 1.20V to the device?

6. The total resistance between X and Y is 14.0Ω. What is the value of R?
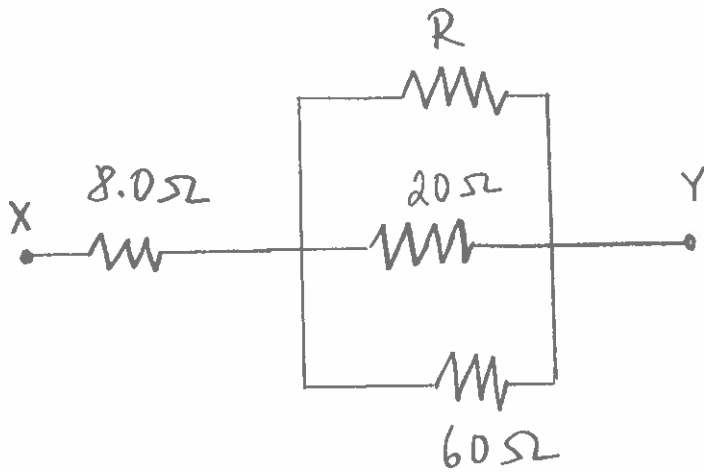
7. The current in the 8.00 Ω resistor in the circuit below is 0.500 A. Find the current in the 20.00Ω resistor. **Justify each value by a calculation or Kirchhoff's Rule.**